VOLVO
Construction Equipment

Service Information

| Document Title: **Appointment and distribution of responsibility** | Function Group: **050** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Appointment and distribution of responsibility

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**WARNING**

**No changes may be made to the electrical system without prior approval from Volvo. Changes may affect machine functions and can result in risks for personal injury or machine damage.**

Volvo Articulated Haulers AB gives only recommendations for retrofitting based on the characteristics and properties of Volvo chassis and that Volvo Articulated Haulers AB can determine prior to retrofitting without knowledge of the specific case involving retrofitting.
Therefore, the responsibility for the retrofit and its compliance to issued requirements rests with those performing the retrofitting. This also applies to the responsibility for the entire vehicle's characteristics and properties to the extent that they are affected by the retrofit. This includes requirements from authorities as well as general suitability and safety requirements.

The dealer/retrofitter is responsible to the customer with regards to giving sufficient instructions about functions and care of the retrofitted equipment and modification of chassis.
When a complete vehicle is sold, the dealer is responsible to the customer that the retrofitted equipment has been installed according to the requirements and retrofitting instructions from Volvo Articulated Haulers AB.
In case of eventual retrofitting work that cannot contain already known requirements or there are any other doubts, contact Volvo Articulated Haulers AB, Special Vehicles department.

The stability may be affected following any and all changes to the basic product. For example, this applies when load body sides are heightened. When special equipment is retrofitted, the instructions in the specification section must be followed. This is especially important in order to maintain the center of gravity within the specified range, both vertically and horizontally.

All welding should be performed according to ISO 5817, welding class C.

**NOTE!**
**No** modification of the machine's **hydraulic system** is allowed without consent from **Volvo Articulated Haulers AB, Special Vehicles department**.

| Document Title: **Basic check, transmission** | Function Group: **090** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Basic check, transmission

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**Purpose of the basic check**

The purpose of the basic check is to provide fast and accurate information about the general condition of the transmission.

The normal work procedure is to perform the basic check following collection of basic data, reading out error codes and checking parameters, if it has not been possible to determine the cause of the malfunction up to that point.

The basic check's tests should be run and evaluated according to instructions in Tech Tool.

**Tests included in the basic check**

The first step in the basic check is to operate the machine, to test-run the vehicle.

The basic check is then divided into the following tests, which should be performed in the order that they are listed, after **reading out error codes, checking parameters** and **operating (test-running)**the machine.

**Tests:**

1. **Op no. 40012-3, Position sensor, gearshift selector, testing**
   The test is used to check that the selected gear position is correctly read in the control unit.
2. **Op no. 40025-3, Solenoid valves, testing**
   The purpose of the test is to check that all solenoid valves work.
3. **Op no 40098-3, Gears, checking oil pressure, testing**
   The purpose of the test is to check the pressure to brakes and clutches in the transmission.
4. **Op no 40027-3, PWM-valves, main and brake pressure, testing**
   The purpose of the test is to check the function of the PWM valves.

This is the sample of the manual if you need complete manual

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| Document Title:<br>**Basic checks** | Function Group:<br>**090** | Information Type:<br>**Service Information** | Date:<br>**17-Feb-21** |
|---|---|---|---|
| Profile:<br>**A40D Volvo** | | | |

# Basic checks

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**NOTE!**
Basic data must always be collected and error codes and parameters must always be checked before the basic check is started; see Troubleshooting, general.

Basic check is performed on each main system. The purpose of the basic check is that it shall give quick and certain information about the status in the sub-system included in each main system.

Each basic check is divided into a number of checks to be performed in order.

If the basic check does not help to locate the cause of the malfunction, the information obtained helps as guidance for continued troubleshooting together with other service information.

The basic check(s) to be performed is determined by the information obtained when the basic data was collected; see Collection of basic data.

**Basic checks:**

- Engine, basic check
- Electrical system, basic check
- Power transmission, basic check
- Brake system, basic check
- Parking brake, basic check
- Steering and hydraulics, basic check

VOLVO
Construction Equipment

**Service Information**

| Document Title: **Collection of basic data** | Function Group: **090** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Collection of basic data

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

The first step in all troubleshooting work is collection of basic data to quickly get a good picture of how the problem manifests itself.

**Figure 1**

In addition to information about machine and customer, it is important to get as much information as possible about events in connection with the occurrence of the malfunction.

The operator can often provide valuable information on the prevailing circumstances when the malfunction occurred since the operator is almost always the first to detect a problem. Often, the malfunction or perceived problems are difficult to recreate if the circumstances are not exactly the same. In these instances in particular, the information from the operator is vital to being able to make correct assessments when continuing troubleshooting.

Use the questions below to interview the operator. Note the responses to the questions and save them together with the work order.

**General data**

- Customer information
- Dealer information
- The operator
- Machine specifications:
    - Machine

- Serial number
- Part number of software in control units

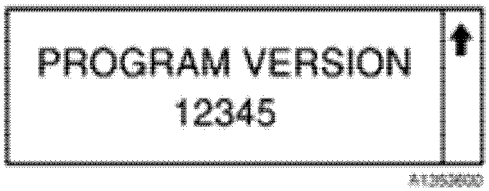



**Figure 2**
Figure part number software, information display unit

- Machine hours
- Engine type
- Engine number
- Delivery date
- Transmission type
- Transmission number

**Problem description**

- Have any error codes been generated?
- Describe the malfunction.
- When did the malfunction occur?
- How was the malfunction detected and what happened just before it was noticed?
- Does the malfunction reappear?
- How often does the malfunction occur?
- How long does the malfunction last when it occurs?
- Does the malfunction always occur during the same conditions, if so, what are they?
- Does the operator have an idea of what may be the probable cause of the malfunction?
- Does the problem still exist?

**Engine data**

- Under what operating conditions does the malfunction occur?
- External conditions that affect the malfunction?
- Is the engine difficult to start?
- Is there abnormal smoke development?
- Are there abnormal engine sounds?
- Have changes in fuel consumption, oil consumption or power been confirmed?
- What type of fuel is used?
- Are additives used in the fuel? If yes, which ones?
- What repairs or other work has been performed on the engine?
- Other information?

**Power transmission, data**

- Under what operating conditions does the malfunction occur?
- External conditions that affect the malfunction?
- What type of oil is used?
- Are additives used in the oil? If yes, which ones?
- When was the last oil change?
- Is there a difference in rolling circumference between the tires that is greater than 1.5%?
- Other information?

**Brake system, data**

- Under what operating conditions does the malfunction occur?

- External conditions that affect the malfunction?
- What type of oil is used?
- Are additives used in the oil? If yes, which ones?
- When was the last oil change?
- When was the last oil filter change?
- Is there abnormal heat generation from one or several wheels?
- Other information?

**Steering and hydraulics, data**

- Under what operating conditions does the malfunction occur?
- External conditions that affect the malfunction?
- What type of oil is used?
- Are additives used in the oil? If yes, which ones?
- When was the last oil change?
- When was the last oil filter change?
- Other information?

VOLVO

Construction Equipment

**Service Information**

| Document Title: **Coolant with freezing and corrosion protection** | Function Group: **030** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Coolant with freezing and corrosion protection

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**Anti-freeze**

Check the anti-freeze every 500 hours.
At delivery, the cooling system is filled with a mixture of 50% water and 50% Volvo Construction Equipment concentrated coolant with freezing protection down to -25°C.
If there's a risk that the ambient temperature drops below this temperature, the freezing protection should be adjusted, see below.

**Corrosion protection**

Volvo Construction Equipment concentrated coolant contains active corrosion protection additives to protect engine and radiator. These additives have a limited service life. Therefore, change the coolant every **3000 hours.**

**NOTE!**
**Volvo Construction Equipment concentrated coolant may not be mixed with other brands of coolant or additives. Mixing could have negative effects**.

Volume and change volume cooling system; see Engine, capacities.
The content of concentrated coolant with anti-freeze protection may not be below 40%.
40% provides protection against freezing down to -25° C.
50% provides protection against freezing down to -37° C.

VOLVO

Construction Equipment

**Service Information**

| Document Title: **Dealers/retrofitter´s responsibility** | Function Group: **050** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Dealers/retrofitter´s responsibility

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

It is important that both Volvo Articulated Haulers' retrofitting instructions and national legal legislation is followed when retrofitting and modifying Volvo chassis.

VOLVO
Construction Equipment

**Service Information**

| Document Title: **Hydraulics** | Function Group: **000** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Hydraulics

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**HYDRAULICS**

The following information is displayed on the unit:

| | |
|---|---|
| Engine dep. xxx bar | Shows hydraulic oil pressure from engine-dependent pumps in bar/psi. |
| Ground dep. xxx bar | Shows hydraulic oil pressure from ground-dependent pump in bar/psi. |

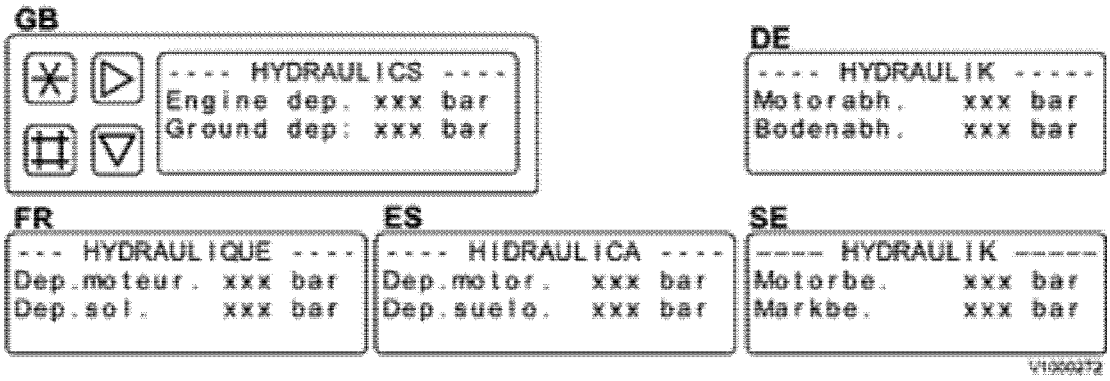



**Figure 1**
HYDRAULICS, all languages

VOLVO CONTRONIC

| | | | |
|---|---|---|---|
| | | - - - HYDRAULICS - - - | |
| Engine dep. | xxx | bar | |
| Ground dep. | xxx | bar | |

**HYDRAUL TANK VALVE**

**NOTE!**

The valve is discontinued on machines of later version, see SE9101, Wiring diagram A24.

**See also 35F9901 Parameters, MO21 module start–stop.**

The following information is displayed on the unit:

Closed no start

Activated

Deactivated

The key is used to shift between activated and not activated.

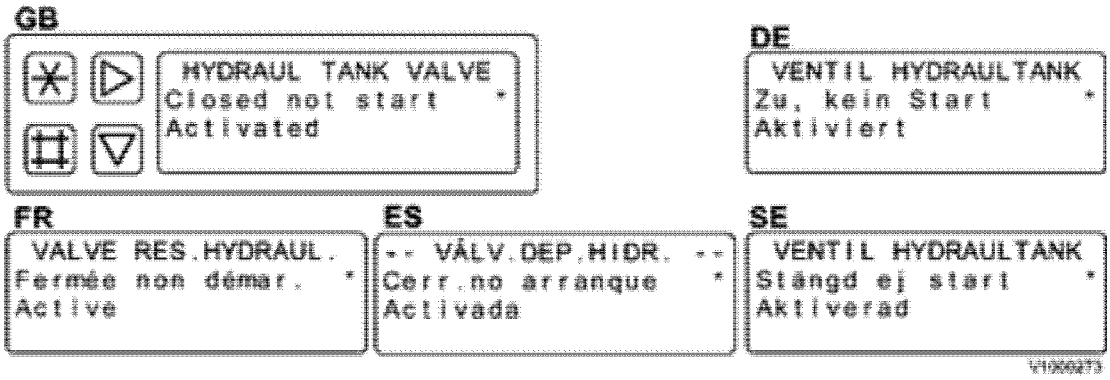



**Figure 2**
HYDRAUL TANK VALVE

VOLVO CONTRONIC

| | | |
|---|---|---|
| | | HYDRAUL TANK VALVE<br>Closed not start *<br>Enabled |

VOLVO
Construction Equipment

**Service Information**

| Document Title: **Information and warning decals** | Function Group: **000** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Information and warning decals

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

Below are the warning and information texts found on the machine. The operator must be familiar with and observe the warnings and information given on labels and plates. Decals / plates that are missing, damaged, painted over or otherwise no longer legible must be replaced immediately.

Spare part number (order number) is shown on each plate / decal, as well as in the spare parts catalogue.

**NOTE!**
The text “WARNING” is shown on the warning decals in North America.

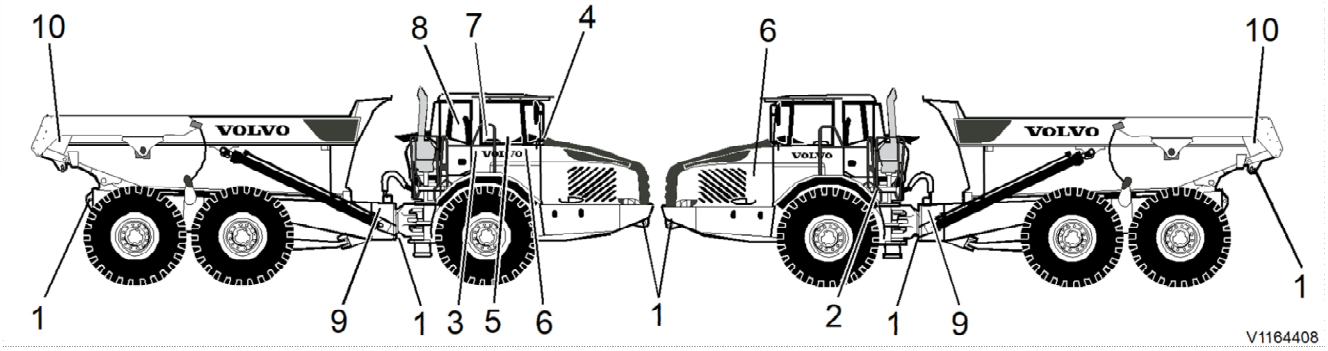
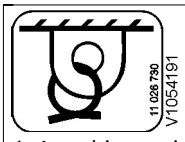
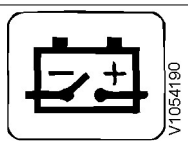
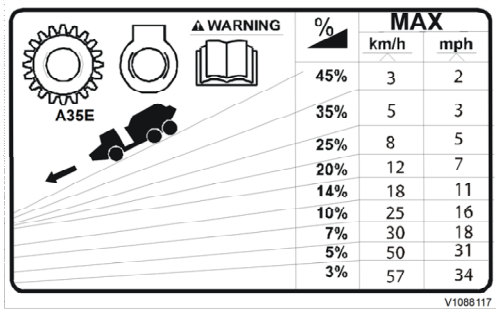



**Figure 1**

| | |
|---|---|
|  V1054191<br>1. Attaching point for lashing |  V1054190<br>2. Battery disconnect switch |

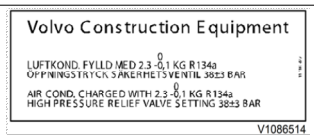
3. Avoid spraying water at air inlets.



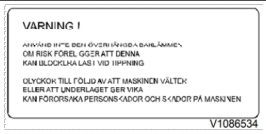

4. Retarder decal

5. WARNING! Do not operate downhill with the gear selector in N-position. Only shift gears with the gas pedal let up.

NOTICE: R134a AC-SYSTEM
System designed acc. to SAE J639 rev.nov91
Caution: System to be serviced by VCE qualified personnel.
See VCE service instruction.
Volvo Construction Equipment
V1086515


Volvo Construction Equipment
LUFTKOND. FYLLD MED 2,3 -0,1 KG R134a
AIR COND. CHARGED WITH 2,3 -0,1 KG R134a
HIGH PRESSURE RELIEF VALVE SETTING 38±3 BAR
V1086514

6. Air conditioning filled with R134a. Opening pressure safety valve (optional equipment)




7. WARNING! Do not use the overhung tailgate (optional equipment) if there is any risk that it can block the load when dumping. Accidents as a result of the machine turning over or the ground giving way can cause personal injuries and machine damage.

8. Emergency exit

9. WARNING! Risk of crushing – frame steering

10. WARNING! Do not enter the work area of a reversing machine

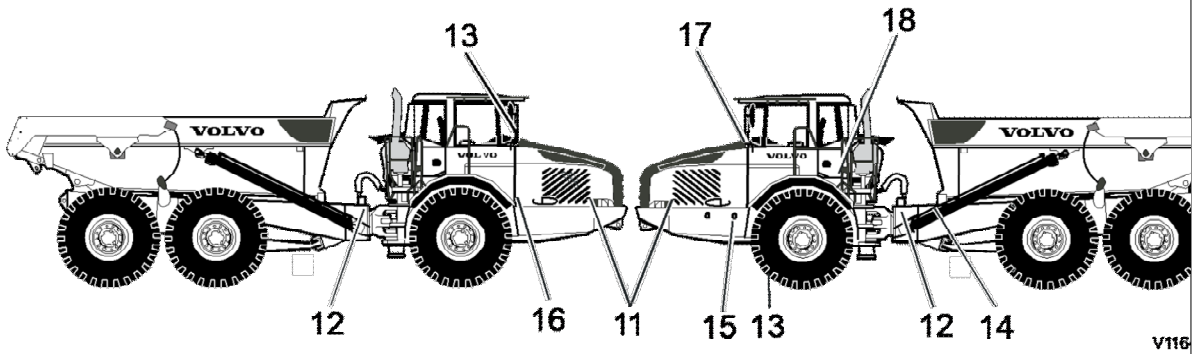
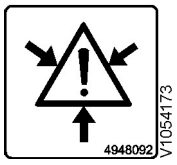


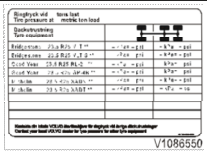

**Figure 2**

11. WARNING! Rotating fan

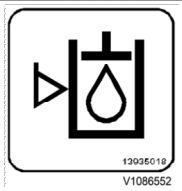
12. WARNING! Do not lean in under a raised load body without first securing it.



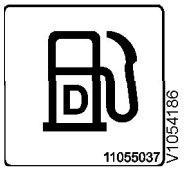
13. Pressurized brake system



14. Tire pressure

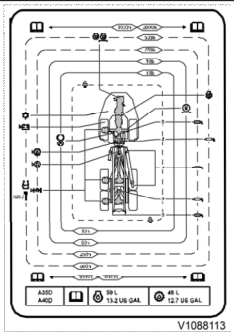


15. Hydraulic oil



16. Fuel

17. WARNING! Only use genuine Volvo coolant VCS – read the Operator's Manual



18. Service decal

VOLVO
Construction Equipment

Service Information

| Document Title: | Function Group: | Information Type: | Date: |
|---|---|---|---|
| **Lifting machine, A35D** | **050** | **Service Information** | **17-Feb-21** |
| Profile: **A40D Volvo** | | | |

# Lifting machine, A35D

Showing Selected Profile

| Valid for serial numbers | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**Op nbr 09001-1**

**WARNING**

**Never stand under the machine when it is suspended in the air.**

**WARNING**

**The lifting tool may only be installed with the special nuts supplied with the tool.**

The lifting tool is considered to be equipment

**NOTE!**
The lifting tool must only be installed on the machine when lifting and transporting it.

**NOTE!**
It is important that correct tools and special nuts are used and that the lifting tool is installed in the correct way. There are different lifting tools depending on which tyres and rims the machine is equipped with.

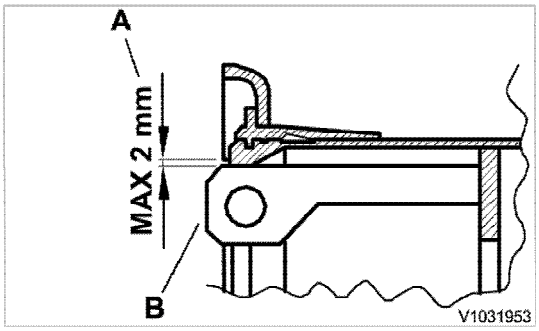



**Figure 1**

A. Clearance between lifting tool and rim, max. 2 mm (0.08 in)
B. Stamped-in part number

There is a stamped-in part number on the lifting tool and it is marked with two decals. They indicate which tool is to be used

This is the sample of the manual if you need complete manual

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with which combination of rim and tyre and which nuts are to be used.
**Tightening torque for lifting tool nuts, 200 Nm (148 lbf ft)**

## Equipment No. 91172

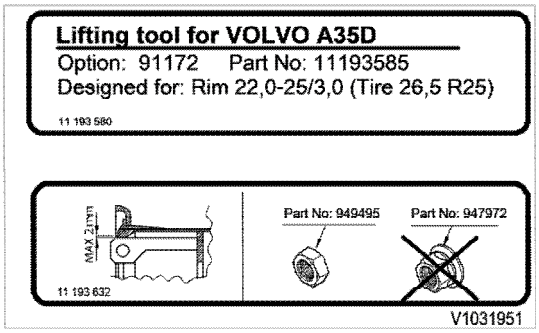


**Figure 2**

Decals on lifting tool 11193585

| Lifting tool | Nut |
|---|---|
| Part. No. 11193585 | Part. No. 949495 |

Used together with:

| Rim | Tyres |
|---|---|
| Part. No. 4781741,<br>22,0–25/3,0 | 26.5 R25 |

## Equipment No. 81041

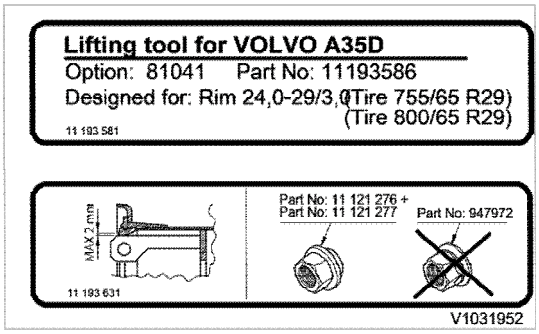


**Figure 3**

Decals on lifting tool 11193586

| Lifting tool | Washer + Nut |
|---|---|
| Part. No. 11193586 | Washer part No. 11121276<br>Nut part No. 11121277 |

Used together with:

| Rim | Tyres |
|---|---|

| | |
|---|---|
| Part. No. 11116884<br>24,0–29/3,0 | 755/65 R29<br>800/65 R29 |

1. Lock the steering joint with the steering joint lock.

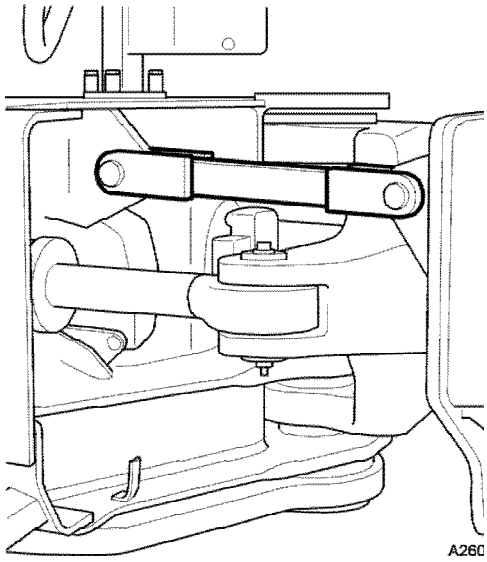

**Figure 4**
Steering joint lock

2. Block the rear wheels.
3. Release the parking brake and disengage the differential locks.
4. Lift the machine using the front eyelets on the frame.

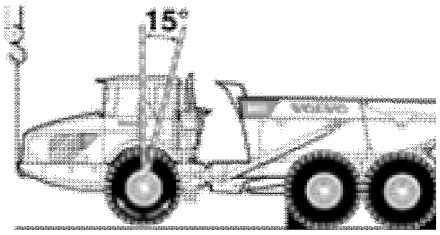


**Figure 5**

5. Turn the front wheels so that the lifting eyelets on the wheels are positioned as shown in the adjacent figure - in line with the lifting sling.

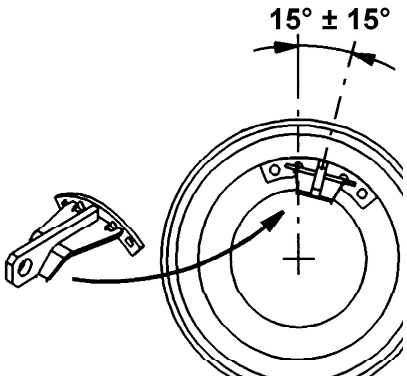


**Figure 6**

**WARNING**

**Do not lift the machine by the load body eyes.**

6. Block the front wheels.
7. Place a lifting sling or strap under the rear end (scow end) of the load body.

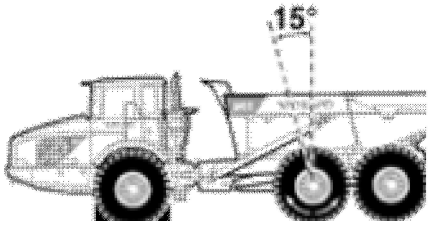


**Figure 7**

8. Turn the front bogie wheels so that the lifting eyelets on the wheels are positioned as shown in the adjacent figure – in line with the lifting sling.

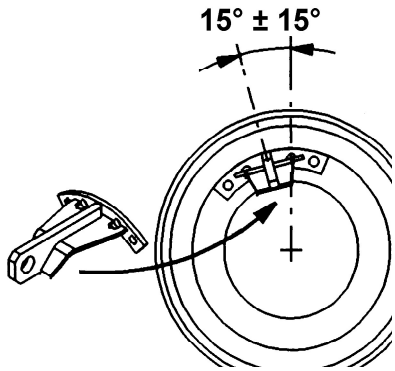


**Figure 8**

9. Lower the machine.
10. Apply the parking brake.

**WARNING**

**The distance between the lifting hook and the wheels' lifting eyes must be at least 8.5 metres.**

**The four lifting slings should be of the same length**

11. Lift the machine by the lifting eyes on the wheels.

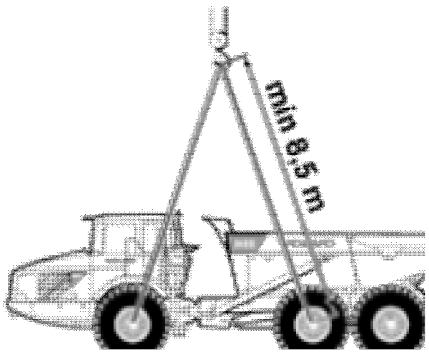


**Figure 9**

12. Lower the machine.

13. Disconnect the steering joint lock before the machine is operated.

VOLVO
Construction Equipment

Service Information

| Document Title: **Lifting machine, A40D** | Function Group: **050** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Lifting machine, A40D

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**Op nbr 09001-1**

**WARNING**

**Never stand under the machine when it is suspended in the air.**

**WARNING**

**The lifting tool may only be installed with the special nuts supplied with the tool.**

The lifting tool is considered to be equipment

**NOTE!**
The lifting tool must only be installed on the machine when lifting and transporting it.

**NOTE!**
It is important that correct tools and special nuts are used and that the lifting tool is installed in the correct way. There are different lifting tools depending on which tyres and rims the machine is equipped with.

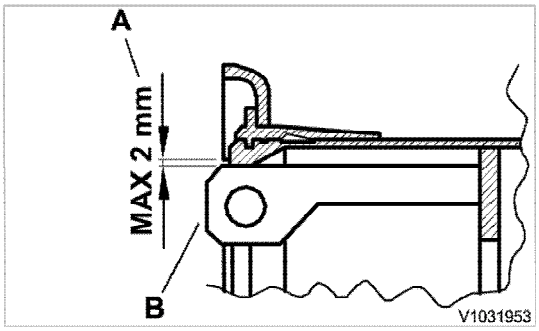


**Figure 1**

A. Clearance between lifting tool and rim, max. 2 mm (0.08 in)
B. Stamped-in part number

There is a stamped-in part number on the lifting tool and it is marked with two decals. They indicate which tool is to be used

with which combination of rim and tyre and which nuts are to be used.
**Tightening torque for lifting tool nuts, 200 Nm (148 lbf ft)**

## Equipment No. 93015

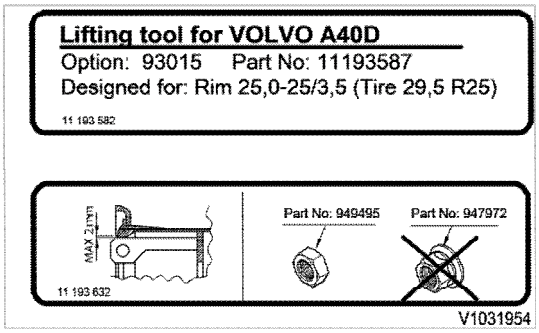


**Figure 2**

Decals on lifting tool 11193587

| Lifting tool | Nut |
|---|---|
| Part. No. 11193587 | Part. No. 949495 |

Used together with:

| Rim | Tyres |
|---|---|
| Part. No. 11056765,<br>25,0–25/3,5 | 29.5 R25 |

## Equipment No. 93302

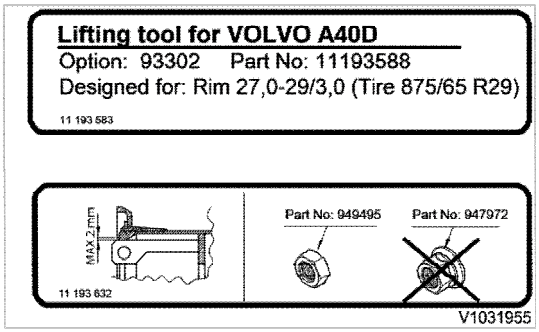


**Figure 3**

Decals on lifting tool 11193588

| Lifting tool | Nut |
|---|---|
| Part. No. 11193588 | Nut part No. 949495 |

Used together with:

| Rim | Tyres |
|---|---|
| Part. No. 11059979 | 875/65 R29 |

1. Lock the steering joint with the steering joint lock.

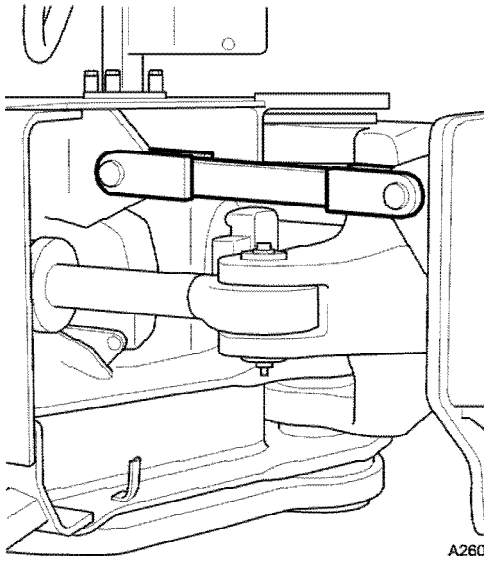

**Figure 4**
Steering joint lock

2. Block the rear wheels.

3. Release the parking brake and disengage the differential locks.

4. Lift the machine using the front eyelets on the frame.

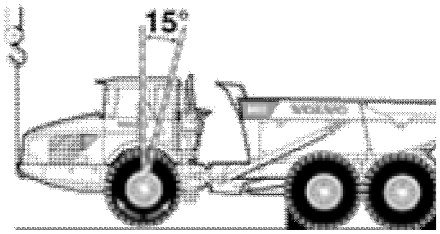


**Figure 5**

5. Turn the front wheels so that the lifting eyelets on the wheels are positioned as shown in the adjacent figure - in line with the lifting sling.

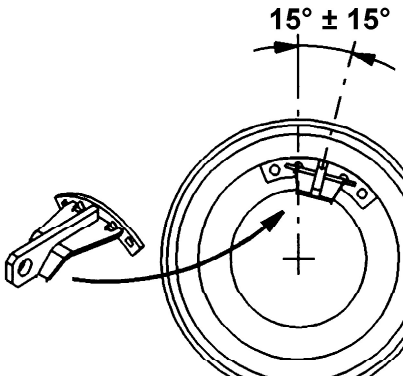


**Figure 6**

**WARNING**

**Do not lift the machine by the load body eyes.**

6. Block the front wheels.
7. Place a lifting sling or strap under the rear end (chute) of the load body.

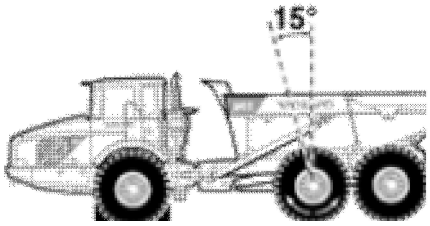


**Figure 7**

8. Turn the front bogie wheels so that the lifting eyelets on the wheels are positioned as shown in the adjacent figure – in line with the lifting sling.

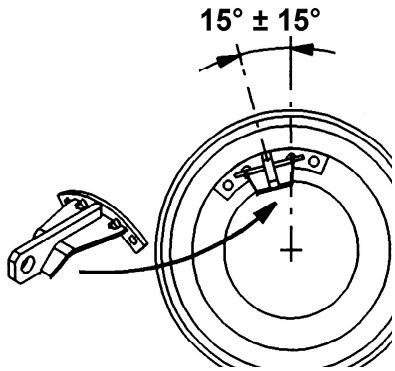


**Figure 8**

9. Lower the machine.
10. Apply the parking brake.

**WARNING**

**The distance between the lifting hook and the wheels' lifting eyes must be at least 8.5 metres.**

**The four lifting slings should be of the same length.**

11. Lift the machine by the lifting eyes on the wheels.

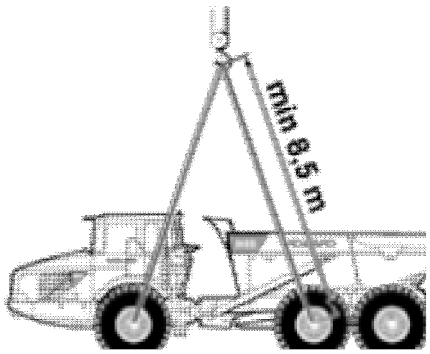


**Figure 9**

12. Lower the machine.

13. Disconnect the steering joint lock before the machine is operated.

VOLVO
Construction Equipment

**Service Information**

| Document Title: | Function Group: | Information Type: | Date: |
|---|---|---|---|
| **Recovering and towing** | **050** | **Service Information** | **17-Feb-21** |
| Profile: **A40D Volvo** | | | |

# Recovering and towing

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

**WARNING**

**Before starting any recovery or towing work, make sure that the parking brake is applied and the wheels are blocked to prevent the machine from rolling. Extreme caution must be observed in connection with towing to prevent accidents and personal injuries.**

**WARNING**

**If the engine cannot be started, the brake and steering functions will be severely limited. In such cases, towing should only be performed in an emergency situation by experienced and trained personnel and only for the shortest possible distance (see towing). If possible, transport the machine on a trailer.**

**General**
If possible, the engine should be running while recovering/towing the machine to ensure satisfactory braking and steering performance.

**Recovering**
Use a towbar, heavy-gauge cable or chain connected to the towing eyes at the front or rear of the machine to tow the machine to a suitable place or passable road.

**Towing**

- If the machine has to be towed to a workshop after recovery, use a towbar or heavy-gauge towing cable connected to the front towing eyes.
- A towbar must always be used if the machine that is to be towed has no brake function.
- The towing vehicle or machine must always be at least as heavy as the towed machine and have sufficient engine and braking power to tow and brake both machines on uphill and downhill grades.
- Always tow the shortest possible distance.
- Maximum towing speed under all conditions is 10 km/h.

  **NOTE!**
  The engine cannot be started by towing the vehicle.

**Case 1 (with engine running)**
The gearshift selector should be in neutral and the parking brake in the operating position. The machine can be towed for 10 km without taking special action.

**Case 2 (without engine running)**
Since the transmission is not lubricated when the engine is not running, the propeller shaft between the transmission and dropbox shall be removed. Then lubrication to the dropbox is maintained at the same time as the machine can be steered.

**Removing the propeller shaft**

1. Place the machine in service position.
2. Block the wheels so that the machine cannot start to roll and release all brakes.
3. Make sure that the front or rear wheels are slightly raised off the ground before removing the propeller shaft's bolts.

**Filling compressed air system**
If necessary, the compressed air system can be filled through the filler valve on the front part of the load unit frame by using compressed air from another machine.

**Releasing the parking brake**
When filling through the filler valve on the compressed air tank, the parking brake is released. The required minimum pressure is approx. 470 kPa (4.7 bar).

The parking brake control must be in the operating position, that is, not applied.

**After recovering/towing**
The following safety measures should be taken before removing the towbar, heavy-gauge cable or chain after recovering/ towing:

1. Park the machine on a level surface.
2. Apply the parking brake.
3. Block the wheels to prevent the machine from rolling.

| Document Title: **Steering cylinder, description** | Function Group: **000** | Information Type: **Service Information** | Date: **17-Feb-21** |
|---|---|---|---|
| Profile: **A40D Volvo** | | | |

# Steering cylinder, description

Showing Selected Profile

| **Valid for serial numbers** | | | |
|---|---|---|---|
| **Model** | **Production site** | **Serial number start** | **Serial number stop** |
| A40D Volvo | | | |

There are two steering cylinder versions depending on serial number

| Version 1<br>Machine | Place of manufacture, serial number | |
|---|---|---|
| | EU | Brazil |
| **A35D** | –11762 | –71113 |
| **A40D** | –10848 | –XXXXX |

| Version 2<br>Machine | Place of manufacture, serial number | |
|---|---|---|
| | EU | Brazil |
| **A35D** | 11763– | 71114– |
| **A40D** | 10849– | XXXXX– |

**Version 1**

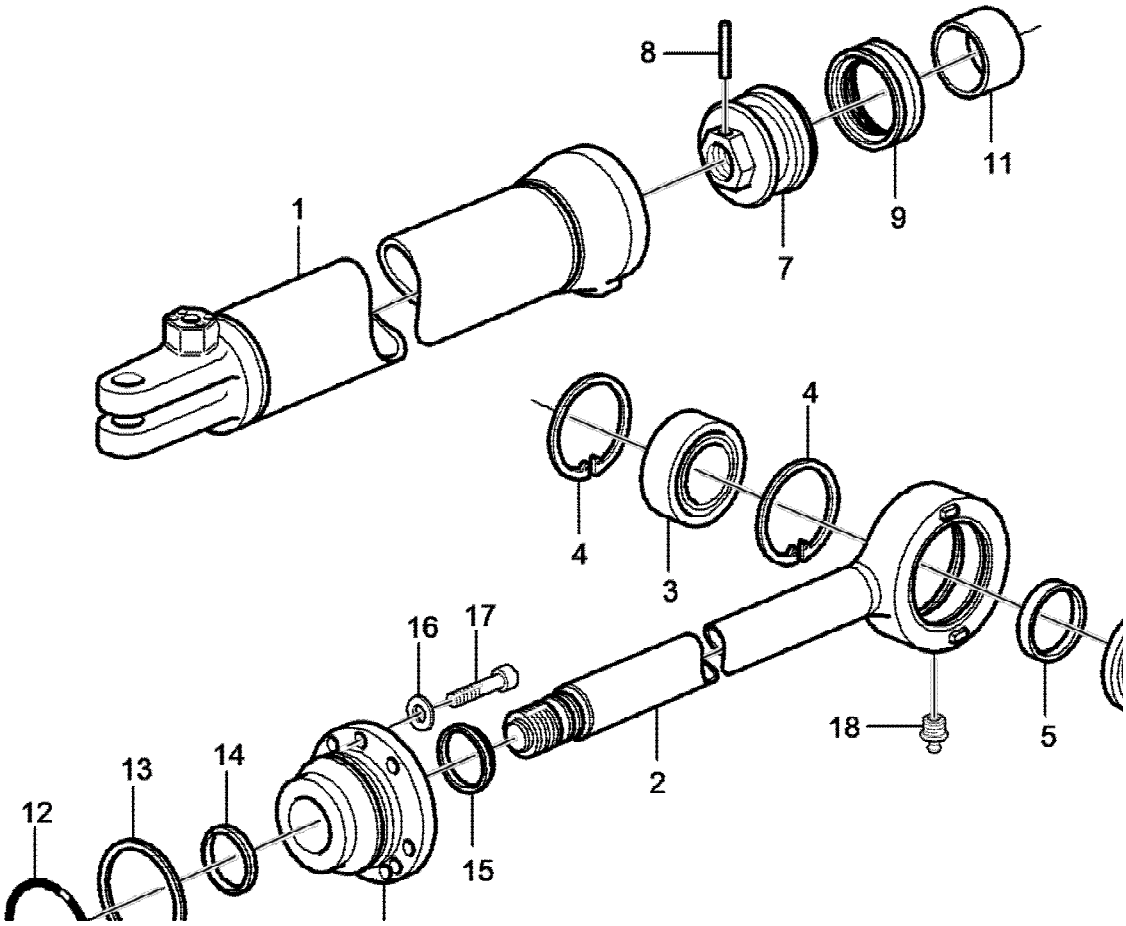


**Figure 1**
Version 1

| Pos. | | Description | Pos. | | Description |
|---|---|---|---|---|---|
| 1 | | Cylinder barrel | 10 | | Piston rod guide |
| 2 | | Piston rod | 11 | | Guide ring |
| 3 | | Roller bearing | 12 | | O–ring |
| 4 | | Circlip | 13 | | Back-up ring |
| 5 | | Sleeve | 14 | | Piston rod seal |
| 6 | | Sealing ring | 15 | | Scraper |
| 7 | | Piston | 16 | | Spring washer |
| 8 | | Pin | 17 | | Screw |
| 9 | | Piston seal | 18 | | Nipple |

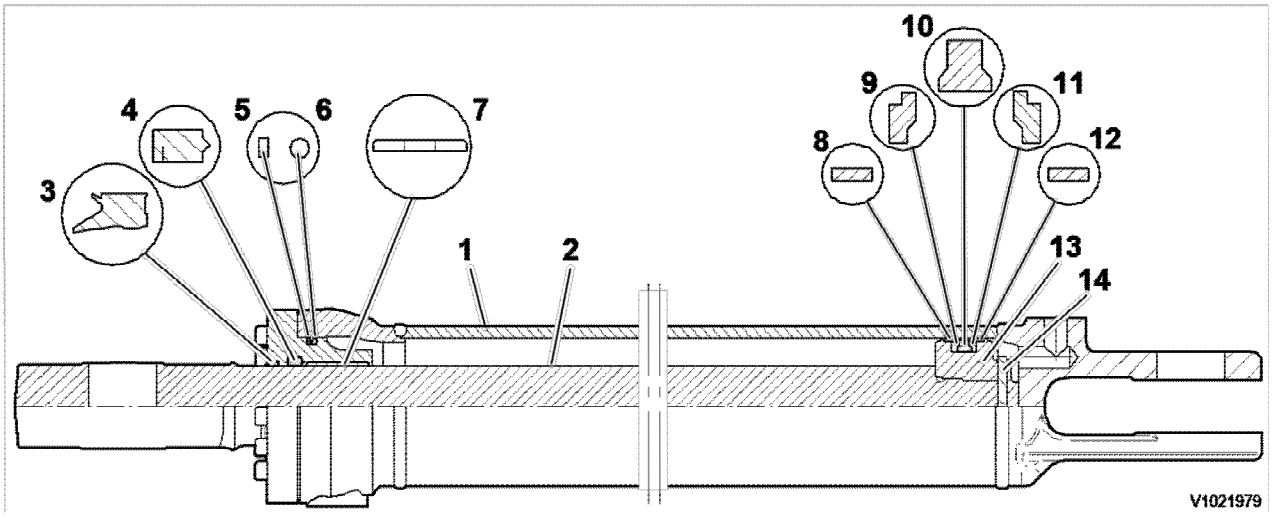


**Figure 2**
Version 1

| Pos. | | Pos. | |
|---|---|---|---|
| 1 | Cylinder barrel | 8 | Guide ring |
| 2 | Piston rod | 9 | Back-up ring |
| 3 | Scraper | 10 | Piston seal |
| 4 | Piston rod seal | 11 | Back-up ring |
| 5 | Back-up ring | 12 | Guide ring |
| 6 | O–ring | 13 | Piston |
| 7 | Guide ring | 14 | Spiral spring pin |

**Version 2**

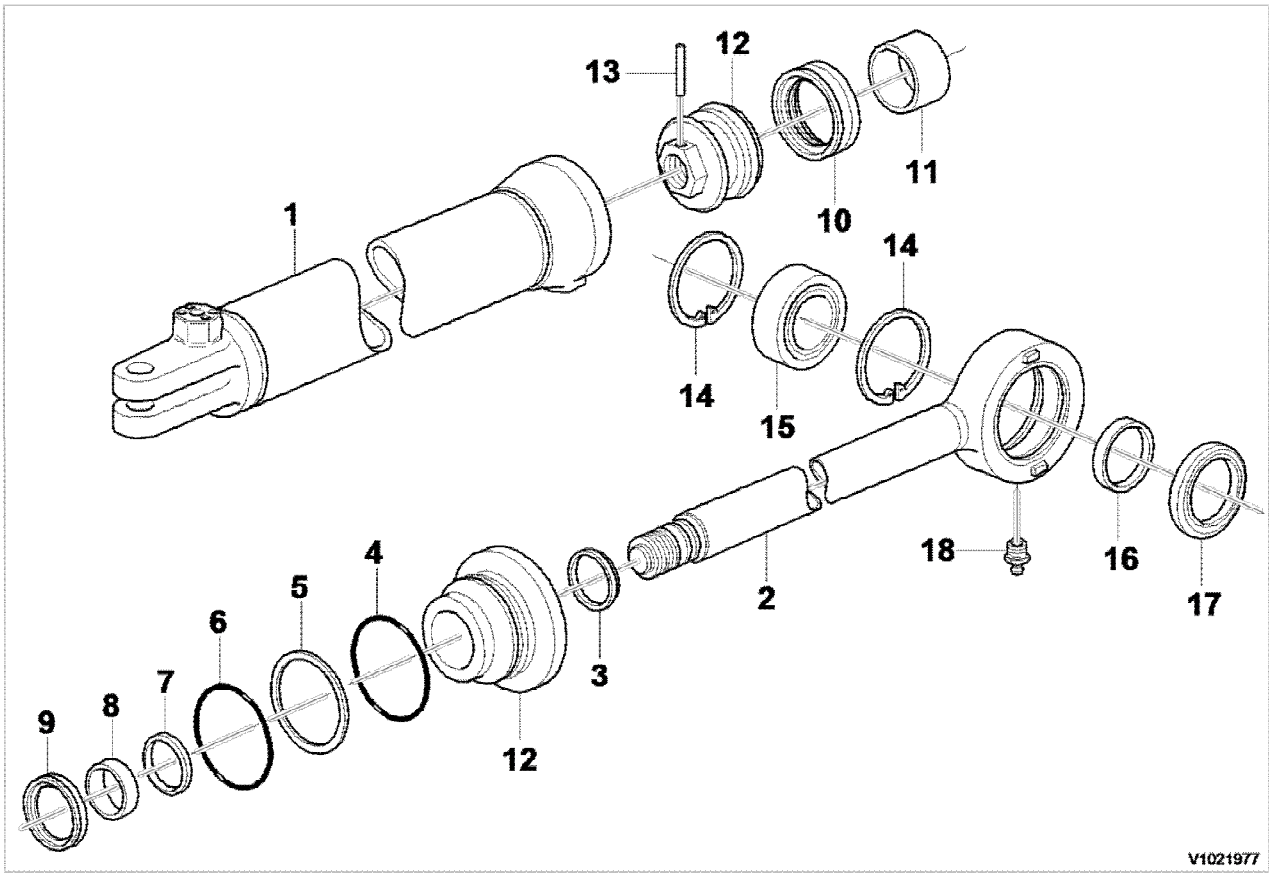


**Figure 3**
Version 2

| Pos. | | Pos. | |
|---|---|---|---|
| 1 | Cylinder barrel | 10 | Piston seal |
| 2 | Piston rod | 11 | Guide ring |
| 3 | Scraper | 12 | Piston |
| 4 | O–ring | 13 | Lock pin |
| 5 | Back-up ring | 14 | Circlip |
| 6 | O–ring | 15 | Roller bearing |
| 7 | Piston rod seal | 16 | Muff |
| 8 | Guide ring | 17 | Sealing ring |
| 9 | Piston rod seal | 18 | Nipple |

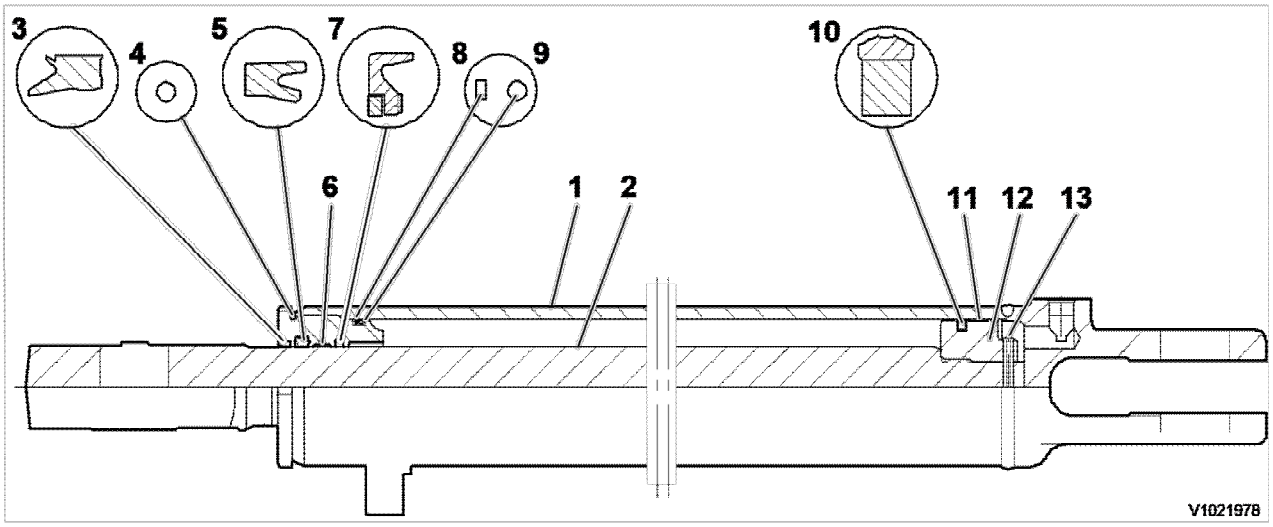


**Figure 4**
Version 2

| Pos. | | Pos. | |
|---|---|---|---|
| 1 | Cylinder barrel | 8 | Back-up ring |
| 2 | Piston rod | 9 | O–ring |
| 3 | Scraper | 10 | Piston seal |
| 4 | O–ring | 11 | Guide ring |
| 5 | Piston rod seal | 12 | Piston |
| 6 | Guide ring | 13 | Spiral spring pin |
| 7 | Piston rod seal | | |

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